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(54) Title: PERPETUAL BATCH ORDER FULFILLMENT

(57) Abstract: A method of batch order fulfillment includes assigning a plurality of orders to a picker. Each order includes multiple units to be picked, and the picker picks the units in a logical travel sequence that generally minimizes a travel time of the picker. The method further includes assigning a new order comprising multiple units to be picked to the picker after one of the previously assigned orders is completed. The picker picks the units of the new order and unpicked units of the previously assigned orders in logical travel sequences that generally minimize a travel time of the picker.

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PERPETUAL BATCH ORDER FULFILLMENT
CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application claims priority to United States Provisional Application No. 61/595,095 filed February 5, 2012, which is incorporated by reference herein in its entirety for all purposes as if fully set forth herein.

BACKGROUND OF THE INVENTION

Field of the Invention

[0002] The present invention relates to a method and system of batch order fulfillment, and a computer usable medium having a computer readable program code embodied therein adapted to be executed to implement the method of batch order fulfillment.

Description of Related Art

[0003] Batch picking is picking multiple orders at a time, \( h_1 \) one method of batch picking, as described in U.S. Patent No. 5,812,986, an RF Cart allows a picker to pick multiple orders at a time while pushing a mobile cart through a warehouse. The cart directs the picker where to go and what to pick in a logical walk sequence.

[0004] Typically, with an RF Cart, multiple orders "N" are assigned to a cart, each order at its own unique location on the cart. The controller (processor or computer) electronically joins the orders together, making them one larger order, referred to in the industry as a "batch". The basis of the batch picking concept is to enable a single picker to pick multiple orders while only walking the distance of a pick line once, thereby improving efficiency.

[0005] In conventional batch picking methodology, "N" orders are assigned to a cart as a batch, and then a picker walks a pick line, picking items as directed by the cart in a walk sequence. After the length of the pick line is completed, "N" orders are completed. With this methodology, the pick line has a starting point and an end point. The process begins at the starting point with "N" empty (unfulfilled) orders and ends at the end point, which is commonly coincident with the start point, with "N" orders completed. It is then emptied and reloaded with "N" new orders and the process is repeated.

[0006] The above process is enhanced by locating warehouse items (SKUs) based on their pick volume. Placing the most commonly picked items near the beginning of the pick line provides the potential that the "N" orders are completed prior to walking the entire pick path, thereby allowing the picker to take a shortcut back to the starting point. However, the process of locating high volume items to the front of the line is time consuming and labor intensive, and warehouse managers struggle with moving stock around to maintain efficient product placement.
SUMMARY OF THE INVENTION

[0007] A method of batch order fulfillment of the present invention includes: assigning a plurality of orders to a picker, each order comprising multiple units to be picked, wherein the picker picks the units in a logical travel sequence that generally minimizes a travel time of the picker; and assigning a new order comprising multiple units to be picked to the picker after one of the previously assigned orders is completed, wherein the picker picks the units of the new order and unpicked units of the previously assigned orders in logical travel sequences that generally minimizes a travel time of the picker.

[0008] The step of assigning a new order may be repeated.

[0009] The method may further include assigning one or more single unit orders to the picker.

[0010] The picker may be a mobile picking cart that has a designated location for each order. The completed order may be removed from its designated location and replaced by the new order. The mobile picking car may also have a designated location for one or more single unit orders.

[0011] The new order may be chosen from the plurality of available orders to be picked based on an increase in the picker's travel time resulting from assigning the new order to the picker.

[0012] A system of batch order fulfillment of the present invention includes: a guidance system that directs a picker to items to be picked in a logical travel sequence that generally minimizes a travel time of the picker, wherein the items to be picked are from a plurality of orders assigned to a picker, each order comprising multiple items to be picked; and an assigning system that assigns a new order comprising multiple items to be picked to the picker after one of the previously assigned orders is completed.

[0013] The assigning system may also assign one or more single unit order(s) to the picker.

[0014] The system may also include a mobile picking cart that has a designated location for each order. The mobile picking cart may have a designated location for one or more single unit orders.

[0015] The assigning system may choose a new order from the plurality of available orders to be picked based on an increase in the picker's travel time resulting from assigning the new order to the picker.

[0016] A computer usable medium of the present invention has a computer readable program code embodied therein, said computer readable program code adapted to be executed to implement a method of batch order fulfillment, the method comprising: assigning
a plurality of orders to a picker, each order comprising multiple units to be picked, wherein the picker picks the units in a logical travel sequence that generally minimizes a travel time of the picker; and assigning a new order comprising multiple units to be picked to the picker after one of the previously assigned orders is completed, wherein the picker picks the units of the new order and unpicked units of the previously assigned orders in logical travel sequences that generally minimizes a travel time of the picker.

[0017] The method may include repeating the step of assigning a new order.

[0018] The method may include assigning one or more single unit orders to the picker.

[0019] The method may include choosing the new order from the plurality of available orders to be picked based on an increase in the picker's travel time resulting from assigning the new order to the picker.

**BRIEF DESCRIPTION OF THE DRAWINGS**

[0020] FIGS. 1A and 1B illustrate a method of batch order fulfillment representative of the related art.

[0021] FIGS. 2A-2E illustrate a method of batch order fulfillment according to an embodiment of the present invention.

**DETAILED DESCRIPTION OF THE INVENTION**

[0022] FIGS. 1A and 1B illustrate a method of batch order fulfillment representative of the related art. In FIG. 1A, a picker 10 is assigned first, second and third orders, each order including multiple units to be picked. From the starting point, the picker picks the units to be picked by travelling along the pick path to the end point of the pick path, thereby completing the first, second and third orders. The process of FIG. 1A is then repeated in FIG. 1B with the picker being assigned three new orders, i.e., fourth, fifth and sixth orders. From the starting point, the picker picks the units to be picked by travelling along the pick path to the end point of the pick path, thereby completing the fourth, fifth and sixth orders. At the end of two complete cycles of picking, the picker is able to complete six orders after walking two times around the pick path.

[0023] The inefficiency of this methodology is evident by the fact that orders are completed at varying points along the pick path, and, as orders are completed, the picker becomes progressively less efficient. If a picker starts with "N" orders and progresses along a route eventually completing one of the orders, the batch now becomes a batch of only N-1 orders. This degradation of picker efficiency continues until the batch becomes only 1 remaining order with remaining units to be picked. Thus, at the end of one walk through the pick path, the picker only picked "N" orders.
FIGS. 2A-E illustrate a method of batch order fulfillment according to an embodiment of the present invention. In FIG. 2A, a picker 20 is assigned first, second and third orders, each order including multiple units to be picked. From the starting point, the picker picks the units to be picked by travelling along the pick path until one of the orders is completed. In this case, the third order is completed when an item is picked from Bin 53. At this time, the picker 20 is assigned a new order, i.e., the fourth order, and continues travelling along the picking path while picking the first, second and fourth orders as shown in FIG. 2B until one of the orders is completed. In this case, the first order is completed when an item is picked from Bin 63. At this time, the picker 20 is assigned another new order, i.e., the fifth order, and continues travelling along the picking path while picking the second, fourth and fifth orders as shown in FIG. 2C until one of the orders is completed. In this case, the second order is completed when an item is picked from Bin 62. At this time, the picker 20 is assigned another new order, i.e., the sixth order, and continues travelling along the picking path while picking the fourth, fifth and sixth orders as shown in FIG. 2D until one of the orders is completed. In this case, the fourth order is completed when an item is picked from Bin 12. At this time, the picker 20 is assigned another new order, i.e., the seventh order, and continues travelling along the picking path while picking the fifth, sixth and seventh orders as shown in FIG. 2E. It is already evident that at the end of two complete cycles, the picker is able to complete at least seven orders after walking two times around the pick path.

The improved efficiency of the methodology of FIGS. 2A-2E is evident by the fact that although orders are completed at varying points along the pick path, new orders are assigned, and the picker maintains efficiency. With this "perpetual batch" methodology, the same picker can complete more orders while walking the same distance.

It will be understood that the above described method is one exemplary embodiment and that the method of batch order fulfillment may include variations from the above description as well as additional features, some of which are described below.

The example of FIGS. 2A-2E shows the first, second and third orders to be added to the cart, such that the third order is completed before the first and second orders are completed. However, according to a preferred embodiment of the present invention, the first order would be completed before the second order is completed, which is completed before the third order is completed.

To understand why the orders would be completed in the order of assignment for the preferred embodiment, it is helpful to understand a certain philosophy. In particular, a pick line, which usually includes multiple aisles (as is adequately shown in the Figures), can
be exploded into a virtual "circle". The pick line represents a pick path that ends where it begins, and thus the pick line can be exploded into a theoretical "circle". Each pick location in the pick line can then be represented in degrees or radians on a circle of circumference "C", where "C" represents the distance required to travel the entire pick path. Each location represents a specific angle on this circle. The distance between pick locations can be represented by the difference between the current location angle on the "circle" and the "angle" of the pick location(s). At the beginning, when no orders are assigned to a batch, the system reviews every order in a queue of pending orders, and determines a distance factor based on the current location of the batch cart. This distance factor represents the distance along the pick path required to complete the order from the current location on the pick path. The order with the lowest distance factor is then added to the batch. In the case of an empty cart, the "N" orders with the smallest distance factor are added to the batch, based on their rankings shortest to longest. Thus, the first order would be the order with the smallest distance to travel from the current location and thus would be the first order to be completed. Thus the third order would not be completed before first order. It should also be noted that the direction of movement around the pick "circle" is always the same direction. No orders are selected that require the picker to move backward on the pick path.

[0029] Once the cart is in normal operation, and new orders are being assigned to the batch, it is possible for newly added order(s) to completed earlier than older orders already assigned. This case exists when the pending pool of orders is dynamically changing based on orders being received from customer throughout the day. Thus the pending pool is dynamic, not a fixed order queue.

[0030] In one embodiment, the picker may be a mobile picking cart that has a designated location for each order. For instance, the cart may have only "N" designated locations for holding orders. According to the method of FIGS. 1A-1B, the cart is used inefficiently as orders are completed, and the cart become less efficient. If the cart starts with "N" assigned orders and progresses along a route eventually completing one of the orders, the batch assigned to the cart now becomes a batch of only N-1 orders. This degradation of cart efficiency continues until the batch becomes only one remaining order with units to be picked. Thus, at the end of one walk through the pick path, the cart only picked "N" orders. However, with the "perpetual batch" methodology, the same cart with "N" locations can complete many more than "N" orders while travelling the same distance.

[0031] Also, the mobile picking cart may be a RF cart. The RF cart is a paperless order fulfillment system that utilizes hardware mounted to a mobile cart. The RF carts provide a
method of picking multiple orders at a time on a single pass through the warehouse, making
order pickers more accurate and productive. The RF carts are computer controlled and
communicate with a centralized computer system via a RF network, providing real-time
response and reporting. The system directs pickers to warehouse pick locations in the most
efficient route, minimizing walk distance while fulfilling multiple orders at once. However,
the RF Cart is merely one exemplary mobile picking cart used in the method of batch
picking. This method can apply to any operation that batch picks orders, regardless if the RF
cart is being utilized. This could be utilized with RF Terminals, Voice recognition, or pick
sleds (basically RF Carts without wheels that travel on a conveyor adjacent to pick locations).

[0032] In one aspect, there is a system of batch order fulfillment in order to achieve the
above-described method. This system may include a guidance system and an assigning
system, which may be integrated together or separate. The guidance system directs the picker
to items to be picked in a logical travel sequence that generally minimizes a travel time of the
picker. The assigning system assigns a new order comprising multiple items to be picked to
the picker after one of the previously assigned orders is completed. The guidance system
may include a system for directing the picker, for example, audibly or visually, or may
include a system for controlling the movement of a vehicle or cart associated with the picker.
The assigning system may include a computer system or other controller that assigned new
orders to the picker from a plurality of available orders to be picked. The computer system or
controller may be separated from but in communication with the picker, or the computer
system may travelling along with the picker as part of the cart or vehicle.

[0033] In another aspect, there may be a computer usable medium having a computer
readable program code embodied therein that is adapted to be executed to implement the
method of batch order fulfillment. With this aspect, software controlling the picking process
creates a batch. Although the orders to be assigned may be chosen randomly or by using
commonality algorithms, it is preferred that the orders to be assigned are chosen based on an
increase in the picker's travel time resulting from assigning the new order to the picker, or
may be chosen based on the minimum travel distance or time from the current point on the
pick path. In this case, the software may assign orders to the picker or cart based on finding
orders that can be completed with the minimum amount of travel from the current cart
position or from the last picked item position.

[0034] Additionally, in another aspect, there is no dedicated start point or endpoint. In this
case, a plurality of carts or pickers may be scattered randomly throughout a pick line. This
distribution of the carts or pickers avoids collision and passing requirements necessitated when multiple pickers are traversing a pick line simultaneously.

[0035] In the case of multiple carts, at the beginning of the picking process, for each cart in the system, the software selects "N" orders corresponding to the number of order locations on the cart, based on the "N" orders that can be completed in the shortest travel distance or shortest travel time. The picker completes picks until he/she reaches a point where an order completes. The order may be removed and placed in a completed order queue, either on the cart, or on a conveyor that transports the order to a shipping area. The software may then determine, from all available orders, which order can be assigned to the freed location on the cart that can be completed in the least travel distance or least travel time. That order is assigned to the freed location and picking continues. The process of replacing completed orders with new orders that can be picked with least travel continues indefinitely, until all orders are completed.

[0036] Also, it is possible that an order can be chosen for assignment other than shortest travel distance or shortest travel time. However, it is generally understood by the inventor that the pick time will generally be minimized and that the number of orders completed per "revolution" of the pick circle exists when the order added to the batch is completed with the shorted distance. Other batch optimization techniques exist that select orders based on commonality, where rather than selecting orders based on distance to complete, orders are selected based on having common items (SKUs). According to simulation analysis, minimizing the distance to complete an order provides the best efficiency, but the present invention is not be limited to that selection method.

[0037] A benefit of the above described embodiments is that "N" location carts are always picking "N" orders at a time. This provides much greater efficiency than the conventional method where the carts progressively get less efficient as the batch size decreases as orders are completed.

[0038] Another benefit of the above-described embodiments is that the methodology thrives on randomness of item location in a warehouse. Having high volume items randomly scattered throughout a pick line actually makes this system more efficient, as there is no start and endpoint. This relieves the warehouse manager of many SKU management tasks along with the associated labor and downtime associated with moving items around.

[0039] Another feature is the potential to handle "Single Unit Orders". In many direct to consumer order fulfillment operations, the order quantity is often a single unit. The perpetual batch methodology can implement the ability to pick single unit orders. For instance, a
single, preferably larger, order location on the batch cart can be dedicated to receive single unit orders. Any order in the system that is a single unit can be dynamically assigned to each individual batch if that item resides between the current location on the pick path and the next batch pick location. Thus, any single unit order is not available for inclusion in batches. These orders are added to any batch cart that happens to be passing the warehouse location. When the single unit order location on the cart fills, it is removed and sent to a secondary processing station where each item is removed and assigned to an order dynamically. As each of these orders is completed as a single unit, no order integrity is required until it arrives at the secondary processing (shipping) station.

[0040] To provide a further description of single unit order shipping, basically, a bin, box, or other storage medium containing batch picked single unit orders is removed from a cart and delivered to a shipping station. This station is typically equipped with a computer, monitor (often touch screen), bar code seamier, label printer, and a scale. Since every item in the tote represents a unique and individual order, each item is a shipment in itself. The operator at the shipping station typically removes an item from the container, scans an identifying bar code on the product, places the item into a shipping container or envelope, and places the item on a scale. The software finds a pending (queued) order that required only that item (SKU) from its database, calculates shipping based on the delivery address and weight, and prints both a shipping label and a packing slip for that order. This process continues for each item in the container.

[0041] It will be understood by those skilled in the art that the word "walking" or "walk" is used because many picking operations include carts that are pushed through a pick line manually, and hence, the picker is walking. The present invention is not limited to circumstances where carts are used or where walking is required. The present invention applies to any situation that utilizes any form of batch picking, whether automated or manual. Also, the present invention is not limited to the use of batch pick carts, which were chosen for describing the process as it is a common implementation of this technology. For example, a conveyor, automatic guided vehicle, conveyed sled, or other method of transportation other than walking could be utilized.

[0042] Although the invention has been described in detail for the purpose of illustration based on what is currently considered to be the most practical and preferred embodiments, it is to be understood that such detail is solely for that purpose and that the invention is not limited to the disclosed embodiments, but, on the contrary, is intended to cover modifications and equivalent arrangements that are within the spirit and scope of the appended claims. For
example, it is to be understood that the present invention contemplates that, to the extent possible, one or more features of any embodiment can be combined with one or more features of any other embodiment.
THE INVENTION CLAIMED IS:

1. A method of batch order fulfillment, the method comprising:
   assigning a plurality of orders to a picker, each order comprising multiple units to be picked, wherein the picker picks the units in a logical travel sequence that generally minimizes a travel time of the picker; and
   assigning a new order comprising multiple units to be picked to the picker after one of the previously assigned orders is completed, wherein the picker picks the units of the new order and unpicked units of the previously assigned orders in logical travel sequences that generally minimizes a travel time of the picker.

2. The method of claim 1, wherein the step of assigning a new order is repeated.

3. The method of claim 1, further comprising assigning one or more single unit orders to the picker.

4. The method of claim 1, wherein the picker is a mobile picking cart that has a designated location for each order.

5. The method of claim 4, wherein the completed order is removed from its designated location and replaced by the new order.

6. The method of claim 4, wherein the mobile picking cart has a designated location for one or more single unit orders.

7. The method of claim 1, wherein the new order is chosen from the plurality of available orders to be picked based on an increase in the picker's travel time resulting from assigning the new order to the picker.

8. A system of batch order fulfillment, the system comprising:
   a guidance system that directs a picker to items to be picked in a logical travel sequence that generally minimizes a travel time of the picker, wherein the items to be picked are from a plurality of orders assigned to a picker, each order comprising multiple items to be picked; and
an assigning system that assigns a new order comprising multiple items to be picked to the picker after one of the previously assigned orders is completed.

9. The system of claim 8, wherein the assigning system assigns one or more single unit orders to the picker.

10. The system of claim 8, further comprising a mobile picking cart that has a designated location for each order.

11. The system of claim 10, wherein the mobile picking cart has a designated location for one or more single unit orders.

12. The system of claim 8, wherein the assigning system chooses a new order from the plurality of available orders to be picked based on an increase in the picker's travel time resulting from assigning the new order to the picker.

13. A computer usable medium having a computer readable program code embodied therein, said computer readable program code adapted to be executed to implement a method of batch order fulfillment, the method comprising:

   assigning a plurality of orders to a picker, each order comprising multiple units to be picked, wherein the picker picks the units in a logical travel sequence that generally minimizes a travel time of the picker; and

   assigning a new order comprising multiple units to be picked to the picker after one of the previously assigned orders is completed, wherein the picker picks the units of the new order and unpicked units of the previously assigned orders in logical travel sequences that generally minimizes a travel time of the picker.

14. The computer usable medium of claim 13, wherein the method includes repeating the step of assigning a new order.

15. The computer usable medium of claim 13, wherein the method includes assigning one or more single unit orders to the picker.
16. The computer usable medium of claim 13, wherein the method includes choosing the new order from the plurality of available orders to be picked based on an increase in the picker’s travel time resulting from assigning the new order to the picker.
INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER

G06Q 10/08(2012.01)j; G06Q 30/06(2012.01)I

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
G06Q 10/08; G06Q 1/123; G06F 17/60; G06F 7/00; G06Q 90/00

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
Korean utility models and applications for utility models
Japanese utility models and applications for utility models

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
eKOMPASS(KIPO internal) & Keywords: batch order, warehouse, picking, time

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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<tr>
<th>Category</th>
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<tbody>
<tr>
<td>A</td>
<td>US 6205396 B1 (TEITCHER; MORDECHAI et al.) 20 March 2001</td>
<td>1-16</td>
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<tr>
<td></td>
<td>See abstract, column 3, line 46 - column 4, line 2, claims 1, 3, 15 and figures 9-15.</td>
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<td></td>
<td>See abstract, paragraphs [0058] - [0063], claims 1-3 and figure 3.</td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>US 2009-0173780 A1 (RAMAMORTHY DINESH et al.) 09 July 2009</td>
<td>1-16</td>
</tr>
<tr>
<td></td>
<td>See abstract, paragraphs [0039] - [0045], claims 1-4 and figures 3A-4C.</td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>KR 10-2006-0020301 A (INCHEON UNIVERSITY INDUSTRY ACADEMIC COOPERATION FOUNDATION) 06 March 2006</td>
<td>1-16</td>
</tr>
<tr>
<td></td>
<td>See abstract, claim 1 and figure i.</td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>US 2008-0270327 A1 (FREUDELSPERGER KARL) 30 October 2008</td>
<td>1-16</td>
</tr>
<tr>
<td></td>
<td>See abstract, claim 10 and figure s.</td>
<td></td>
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* Further documents are listed in the continuation of Box C.  
\[ See patent family annex. \]

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<th>Date of mailing of the international search report</th>
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<td>14 May 2013 (14.05.2013)</td>
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<table>
<thead>
<tr>
<th>Patent document cited in search report</th>
<th>Publication date</th>
<th>Patent family member(s)</th>
<th>Publication date</th>
</tr>
</thead>
<tbody>
<tr>
<td>US 6205396 B1</td>
<td>20.03.2001</td>
<td>AU 3046097 A</td>
<td>21.01.1998</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Wo 98-00819 A2</td>
<td>08.01.1998</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Wo 98-00819 A3</td>
<td>25.06.1998</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TW 508516 B</td>
<td>01.11.2002</td>
</tr>
<tr>
<td>KR 10-2006-0020301 A</td>
<td>06.03.2006</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>AT 500727 A3</td>
<td>15.03.2007</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DE 502005004540 D1</td>
<td>07.08.2008</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EP 1799594 A1</td>
<td>27.06.2007</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EP 1799594 B1</td>
<td>25.06.2008</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Wo 2006-029433 A1</td>
<td>23.03.2006</td>
</tr>
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</table>